Municipal Stormwater Management Plan For Borough of Butler Morris County, New Jersey

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Introduction

This Municipal Stormwater Management Plan (MSWMP) documents the strategy for the Borough of Butler to address stormwater-related impacts. The creation of this plan is required by The Municipal Stormwater Regulation Program (N.J.A.C. 7:14A-25). This plan contains all of the required elements described in the Stormwater Management Rules (N.J.A.C. 7:8). The plan addresses groundwater recharge, stormwater quantity, and stormwater quality impacts by incorporating stormwater design and performance standards for new major development, defined as projects that disturb one or more acre of land. These standards are intended to minimize the adverse impact of stormwater runoff on water quality and water quantity and the loss of groundwater recharge that provides base flow in receiving water bodies. The plan describes long-term operation and maintenance measures for existing and future stormwater facilities.

A "build-out" analysis has been included in this plan based upon existing zoning and land available for development. The plan also addresses the review and update of existing ordinances, the Borough Master Plan, and other planning documents to allow for project designs that include low impact development techniques. The final component of this plan is a mitigation strategy for when a variance or exemption of the design and performance standards is sought. As part of the mitigation section of the stormwater plan, specific stormwater management measures are identified to lessen the impact of existing development.

Goals

The goals of this MSWMP are to:

- reduce flood damage, including damage to life and property;
- minimize, to the extent practical, any increase in stormwater runoff from any new development;
- reduce soil erosion from any development or construction project;
- assure the adequacy of existing and proposed culverts and bridges, and other in-stream structures;
- maintain groundwater recharge;
- prevent, to the greatest extent feasible, an increase in nonpoint pollution;
- maintain the integrity of stream channels for their biological functions, as well as for drainage;
- minimize pollutants in stormwater runoff from new and existing development to restore, enhance, and maintain the chemical, physical, and biological integrity of the waters of the state, to protect public health, to safeguard fish and aquatic life and scenic and ecological values, and to enhance the domestic, municipal, recreational, industrial, and other uses of water; and,
- protect public safety through the proper design and operation of stormwater basins.

In addition, it is the purpose of the Borough of Butler's stormwater management requirements, outlined in Article XIV (Chapters 143-96 through 143-102) of the Borough's Land Development Ordinance, to establish minimum stormwater management requirements and controls to serve the purposes expressed in the state's Stormwater Management Act (NJSA 40:55D-93) and Stormwater Management Rules (NJAC 7:8).

To achieve these goals, this plan outlines specific stormwater design and performance standards for new development. Additionally, the plan proposes stormwater management controls to address impacts from existing development. Preventative and corrective maintenance strategies are included in the plan to ensure long-term effectiveness of stormwater management facilities. The plan also outlines safety standards for stormwater infrastructure to be implemented to protect public safety.

Stormwater Discussion

Land development can dramatically alter the hydrologic cycle (See Figure 1) of a site and, ultimately, an entire watershed. Prior to development, native vegetation can either directly intercept precipitation or draw that portion that has infiltrated into the ground and return it to the atmosphere through evapotranspiration. Development can remove this beneficial vegetation and replace it with lawn or impervious cover, reducing the site's evapotranspiration and infiltration rates. Clearing and grading a site can remove depressions that store rainfall. Construction activities may also compact the soil and diminish its infiltration ability, resulting in increased volumes and rates of stormwater runoff from the site. Impervious areas that are connected to each other through gutters, channels, and storm sewers can transport runoff more quickly than natural areas. This shortening of the transport or travel time quickens the rainfall-runoff response of the drainage area, causing flow in downstream waterways to peak faster and higher than natural conditions. These increases can create new and aggravate existing downstream flooding and erosion problems and increase the quantity of sediment in the channel. Filtration of runoff and removal of pollutants by surface and channel vegetation is eliminated by storm sewers that discharge runoff directly into a stream. Increases in impervious area can also decrease opportunities for infiltration which, in turn, reduces stream base flow and groundwater recharge. Reduced base flows and increased peak flows produce greater fluctuations between normal and storm flow rates, which can increase channel erosion. Reduced base flows can also negatively impact the hydrology of adjacent wetlands and the health of biological communities that depend on base flows. Finally, erosion and sedimentation can destroy habitat from which some species cannot adapt.

In addition to increases in runoff peaks, volumes, and loss of groundwater recharge, land development often results in the accumulation of pollutants on the land surface that runoff can mobilize and transport to streams. New impervious surfaces and cleared areas created by development can accumulate a variety of pollutants from the atmosphere, fertilizers, animal wastes, and leakage and wear from vehicles. Pollutants can include metals, suspended solids, hydrocarbons, pathogens, and nutrients.

In addition to increased pollutant loading, land development can adversely affect water quality and stream biota in more subtle ways. For example, stormwater falling on impervious surfaces or stored in detention or retention basins can become heated and raise the temperature of the downstream waterway, adversely affecting cold water fish species such as trout. Development can remove trees along stream banks that normally provide shading, stabilization, and leaf litter that falls into streams and becomes food for the aquatic community.

Background

Borough Description

The Borough of Butler encompasses 2.1 square mile area in the northeasterly section of Morris County, New Jersey. The Borough is bordered by the Borough of Riverdale to the east, the Borough Bloomingdale to the north, the Township of West Milford to the northwest and the Borough of Kinnelon to the west and south. The population of the Borough has increased by 28 persons, from 7,392 in 1990, to 7,420 in 2000, an increase of 0.4%. Although there has been no significant increase in population during this time period, there have been changes in the landscape which have most likely increased stormwater runoff volumes and pollutant loads to the waterways of the municipality. In addition, there has been increased commercial development along the State Route 23 corridor. Figure 2 illustrates the Borough of Butler boundary on USGS Quadrangle.

The Borough has exhibited water quantity problems including flooding, stream bank erosion, and diminished base flow in its streams. Flooding within the Borough is limited to immediate areas along banks of the Pequannock River and Stone House Brook. The Pequannock River flows east along the northerly municipal boundary. Stone House Brook flows northeast from the western corporate limits at the southerly side of Cascade Way, to its confluence with the Pequannock River which occurs at the southeasterly intersection of Main Street and Paterson Hamburg Turnpike. The Pequannock River is essentially the dividing line between Morris and Passaic Counties. During very large storm events, low-lying areas are subject to periodic flooding caused by the overflow of the Pequannock River and Stone House Brook. A portion of Stone House Brook, between Von Blitz Avenue and Cascade Way, is known as Lake Edenwold.

The entire length of the Pequannock River within the Borough of Butler is designated as a "Category One" water body. The NJDEP has designated a special level of protection for a number of waterways in New Jersey. This protection targets water bodies that provide drinking water, habitat for endangered and threatened species, and popular recreational and/or commercial species, such as trout or shellfish. Waterways can be designated Category One because of exceptional ecological significance, exceptional water supply significance, exceptional recreational significance, exceptional shellfish resource, or exceptional fisheries resource. The Category One designation provides additional protections to water bodies that help prevent water quality degradation and discourage development where it would impair or destroy natural resources and environmental quality. The maintenance of water quality resources is important to all residents, particularly to the many communities that depend upon surface waters for public, industrial, and agricultural water supplies, recreation, tourism, fishing, and shellfish harvesting. Many, if not all, tributaries of the Pequannock River have been nominated for inclusion in the Category One designation for reasons including the

use of these waters for drinking water; exceptional ecological significance; exceptional recreational significance; and, exceptional water supply.

Effective October 16, 2006, Stone House Brook has received Category One status, between the Valley Road bridge and its confluence with the Pequannock River. This portion of Stone House Brook has also been given trout production (TP) status. The Valley Road bridge is located approximately 180-feet west of the Boonton Avenue intersection (County Route 511). Stone House Brook converges with the Pequannock River just south of the Main Street and Paterson-Hamburg Turnpike intersection at the municipal boundary with the Borough of Bloomingdale, Passaic County.

As imperviousness increases in the Borough, the peak and volumes of stream flows also increase. The increase in the amount of water results in stream bank erosion, which results in unstable areas at roadway and bridge crossings, and degraded stream habitats. The high imperviousness of the Borough has significantly decreased groundwater recharge, decreasing base flows in streams during dry weather periods. Lower base flows can have a negative impact on in-stream habitat during the summer months

Waterway Health

The New Jersey Department of Environmental Protection (NJDEP) has established an Ambient Biomonitoring Network (AMNET) to document the health of the state's waterways. There are over 800 AMNET sites throughout the state of New Jersey. These sites are sampled for benthic macroinvertebrates by NJDEP on a five-year cycle. Streams are classified as non-impaired, moderately impaired, or severely impaired based on the AMNET data. The data is used to generate a New Jersey Impairment Score (NJIS), which is based on a number of biometrics related to benthic macroinvertebrate community dynamics.

The New Jersey Integrated Water Quality Monitoring and Assessment Report (305(b) and 303(d)) (Integrated List) is required by the federal Clean Water Act to be prepared biennially and is a valuable source of water quality information. This combined report presents the extent to which New Jersey waters are attaining water quality standards, and identifies waters that are impaired. The USEPA Guidance for developing Integrated Reports of water quality and listings of impaired water segments recommends placing the assessment results into one of five specific categories as follows:

- Category 1: A water body is attaining for all designated uses and no uses are threatened;
- Category 2: Water body is attaining the designated use;
- Category 3: Insufficient or no data and information to determine if the designated use is attained;
- Category 4: Impaired or threatened for one or more designated uses but does not require the development of a TMDL (3 sub-categories).
 - A. TMDL has been completed.
 - B. Other enforceable pollution control requirements are reasonably expected to result in the attainment of the water quality standard in the near future.
 - C. Impairment is not caused by a pollutant.
- Category 5: The designated use is not attained. The water body is impaired or threatened for one or more designated uses by a pollutant(s), and requires a TMDL.

There are four monitoring sites within the Borough. Two of the sites have been included in Category 1 and two of the sites have been included in Category 5. Benthic macroinvertebrates have been given a Category 1 classification for the Pequannock River at County Route 511. Fecal coliform has been given a Category 1 classification for the Stonybrook Swim Club Lake. Elevated levels of fecal coliform have been identified in Lake Edenwold and elevated temperature readings have been measured in the Pequannock River; both of these water bodies have been designated as Category 5 with respect to these parameters and TMDLs are required. The following table summarizes these monitoring sites:

		Watershed					
	Watershed	Management	Station				
Sublist	Region	Area	Name/Waterbody	Site ID	Parameters	Priority	Data Source
			Lake Edenwold-	Lake			
5	Northeast	03	03	Edenwold	Fecal Coliform	High	Butler HD
			Pequannock River				Pequannock River
5	Northeast	03	- Butler	PQ10	Temperature	High	Coalition
			Pequannock River		Benthic		NJDEP
1	Northeast	03	at Rt 511 in Butler	AN0265	Macroinvertebrates	n/a	AMNET
			Stonybrook Swim	Stonybrook			
1	Northeast	03	Club Lake-03	Swim Club	Fecal Coliform	n/a	Butler HD

Source: 2004 Integrated Water Quality Monitoring & Assessment Report

In September 2004, an amendment to the Northeast Water Quality Management Plan has been "established" for a temperature in the Pequannock River; an amendment has not been "adopted" as of the date of this report. No specific information on the status of a TMDL for fecal coliform in Lake Edenwold is available; however, a TMDL has been "approved" as of September 15, 2005, for the Pequannock River and associated tributaries which would include Stone House Brook and Lake Edenwold.

A TMDL is considered "proposed" when NJDEP publishes the TMDL Report as a proposed Water Quality Management Plan Amendment in the New Jersey Register (NJR) for public review and comment. A TMDL is considered to be "established" when NJDEP finalizes the TMDL Report after considering comments received during the public comment period for the proposed plan amendment and formally submits it to EPA Region 2 for thirty (30)-day review and approval. The TMDL is considered "approved" when the NJDEP-established TMDL is approved by EPA Region 2. The TMDL is considered to be "adopted" when the EPA-approved TMDL is adopted by NJDEP as a water quality management plan amendment and the adoption notice is published in the NJR. The

Department is in the process of adopting each of the approved TMDLs to the appropriate management plan and does not anticipate that there will be significant, if any change to TMDL implementation plans upon its adoption.

Flooding

The areas of special flood hazard are identified by the Federal Insurance Administration in a report entitled the "Flood Insurance Study for the Borough of Butler," dated October 15, 1985, with accompanying Flood Insurance Rate Maps and Flood Boundary-Floodway Maps. The Flood Insurance Study is on file in the Borough of Butler Municipal Building. By reference, this Code is made part of this Municipal Stormwater Plan.

Wellhead Protection Areas

There are no Public Community Water Supply (PCWS) wells or wellhead protection areas within the Borough of Butler.

Groundwater Recharge

A map of the various annual groundwater recharge rates in the Borough are depicted in Figure 3. As can be seen in the Figure, the annual recharge rates in the Borough range from essentially no recharge to an annual rate of 17 inches per year. These annual recharge rates were obtained from the New Jersey Geological Survey (NJGS) and are based on New Jersey Geological Survey Report GSR-32 – A Method for Evaluating Ground-Water-Recharge Areas in New Jersey. These rates are presented as guidance for identifying both general groundwater recharge rates and areas for potential recharge measures and are not intended for design purposes.

Geology

Figure 4 depicts the different soil types within the Borough. According to the Soil Survey of Morris County, prepared by the USDA National Resource Conservation Service and the NJ Agricultural Experiment Station, "Rockaway" is the major soil type within the Borough. Soils within the Borough of Butler consist of soils formed in young glacial till and are generally classified as Rockaway-Hibernia-Urban land association and Rockaway-Rock outcrop association. Rockaway-Hibernia-Urban land association soils are deep, well drained to somewhat poorly drained, gently sloping to steep gravelly sandy loams and stony to extremely stony loams and sandy loams that overlie granitic gneiss. Rockaway-Rock outcrop association soils are deep, well drained and moderately well drained, strongly sloping to very steep slop, very stony and extremely stony sandy loams that overlie granitic gneiss, and strongly sloping to very steep rock outcrops.

Watersheds

The Borough of Butler is located within Watershed Management Area 3. According to the NJDEP and USGS, the entire Borough is located within the Pequannock River watershed (below the Macopin gauge). Figure 5 shows the Hydrologic Unit Code (HUC) 14 area within the Borough. The HUC14 information for this watershed is shown below:

Sub-						Management	
Sub-Watershed	Watershed		Watershed	Watershed	Watershed	Area	Water
Name	ID	HUC 14	Name	ID	Management Area	ID	Region
Pequannock River					Pompton, Pequannock,		
(below Macopin gage)	03AA08	02030103050080	Pequannock River	03AA	Wanaque, Ramapo	3	Northeast

Design and Performance Standards

Any major residential land development proposed subject to review and approval by the Borough of Butler will also be reviewed in accordance with the stormwater management requirements of the New Jersey Residential Site Improvement Standards (NJAC 5:21). These standards may be supplemented where permitted by additional stormwater design and performance standards developed by the Borough. In addition, any application for a new agricultural development that meets the definition of major development shall be submitted to the Morris County Soil Conservation District for review and approval in accordance with the requirements of this section and the Standards for Soil Erosion and Sediment Control in New Jersey.

In accordance with the requirements of the New Jersey Stormwater Management Rules (NJAC 7:8), major land developments within the Borough of Butler will be required to meet specific stormwater design and performance standards. The stormwater design and performance standards will be applied to major developments through the forthcoming Stormwater Control Ordinance that will be developed and adopted by the Borough following the adoption of this Municipal Stormwater Management Plan. Complete details of each standard can be found in Subchapter 5 of the New Jersey Stormwater Management Rules and summaries of these design and performance standards are presented below:

<u>Soil Erosion and Sediment Control:</u> All major developments shall meet the requirements of the Soil Erosion and Sediment Control Standards for New Jersey. The Morris County Soil Conservation District has review authority for compliance with these standards.

<u>Groundwater Recharge:</u> Unless otherwise exempted by the Stormwater Management Rules, all major developments must either maintain 100% of the development site's pre-developed annual groundwater recharge under post-developed site conditions or infiltrate the runoff increase between pre- to post-developed site conditions for a 2-Year, 24-hour III storm. Compliance with this standard must consider certain designated redevelopment areas, WHPAs, and known contaminated sites within the Borough.

<u>Stormwater Quality:</u> All major developments must reduce the total suspended solids (TSS) load in the development site's post-construction runoff by a minimum of 80%. In addition, the post-construction nutrient load from the site must be reduced by the maximum extent feasible. Additional stormwater quality requirements are described below for land developments that drain to a Category One watercourse or its mapped tributaries.

<u>Stormwater Quantity:</u> All major developments must demonstrate compliance with one of three alternative stormwater quantity requirements for the 2, 10, and 100-Year storm events. These alternatives are: 1) preservation of existing development site runoff volumes and rates, 2) preservation of existing downstream peak runoff rates under full watershed development, or 3) reduction in existing site peak runoff rates by 50%, 25%, and 20%, respectively.

<u>Nonstructural Stormwater Management</u> - Compliance with the groundwater recharge and stormwater quality and quantity standards described above must be achieved through the use of nonstructural stormwater management measures to the maximum extent feasible. If the standards cannot be met through the exclusive use of nonstructural measures, then structural stormwater management measure shall be utilized to complete compliance.

Special Water Resource Protection Areas: All major developments must maintain a 300-foot buffer measured from the top of bank of all Category One watercourses, as designated by the NJDEP, and their tributaries, as mapped by the USGS and the Soil Survey of Morris County. At the present time, the entire length of the Pequannock River within the Borough's corporate limits is designated as a Category One watercourse. As such, this requirement will apply to any waterway within the Borough designated as a Category One watercourse by the NJDEP in the future. According to Appendix B (Classification of New Jersey Waters as Related to Their Suitability for Trout) of the Coldwater Fisheries Management Plan, prepared by the New Jersey Division of Fish and Wildlife, dated December 2003, Stone House Brook is currently listed as a non-trout water body but has a "potential classification" to be listed as a trout production water body. Therefore, Stone House Brook will be likely be classified as a Category One water body in the future and would be subject to 300-ft buffers, similar to the Pequannock River.

<u>Threatened and Endangered Species Searches:</u> All major developments subject to review by NJDEP's Land Use Regulation Program must conduct a Threatened and Endangered Species search using the Natural Heritage Database.

Plan Consistency

The Borough is not within a Regional Stormwater Management Planning Area; therefore, this plan does not need to be consistent with any regional stormwater management plans.

TMDLs have been "proposed" for fecal coliform in Lake Edenwold and for temperature in the Pequannock River. This Municipal Stormwater Management Plan will be updated to be consistent with these TMDLs after they have been adopted.

The Municipal Stormwater Management Plan is consistent with the Residential Site Improvement Standards (RSIS) at N.J.A.C. 5:21. The municipality will utilize the most current update of the RSIS in the stormwater management review of residential areas. This Municipal Stormwater Management Plan will be updated to be consistent with any future updates to the RSIS.

The Borough's Stormwater Management Ordinance requires all new development and redevelopment plans to comply with New Jersey's Soil Erosion and Sediment Control Standards. During construction, Borough inspectors will observe on-site soil erosion and sediment control measures and report any inconsistencies to the Morris County Soil Conservation District.

Nonstructural Stormwater Management Strategies

In order to meet the design and performance standards for major land developments described in Subchapter 5 of the Stormwater Management Rules, the Borough will allow the utilization of a range of nonstructural management measures. In general, the design, construction, and maintenance of these measures, which are also known as Best Management Practices or BMPs, will be based upon the guidance provided by the current version of the NJDEP Stormwater Best Management Practices Manual. In particular, the guidance provided in Chapter Two of the Manual will be used for

nonstructural stormwater management measures. As a result, the NJDEP Stormwater Best Management Practices Manual is incorporated by reference into the Borough of Butler's Municipal Stormwater Management Plan.

The Borough's ordinances are currently being reviewed to determine the proper amendments to implement the principles of nonstructural stormwater management. The Borough's master plan is currently being updated and will be completed by the end of 2006. This plan and the revised ordinances will be submitted to Morris County for review with a copy to the NJDEP, along with a copy of the master plan, maps, and an adoption schedule.

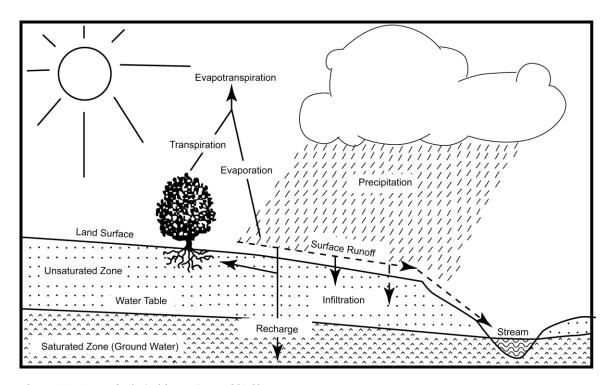
Land Use/Build-Out Analysis

A build-out analysis is part of the Borough's Master Plan and is made part of this Stormwater Management Plan by reference. Figure 6 shows the current land use within the Borough and Figure 7 shows the current zoning districts within the Borough.

Mitigation Plans

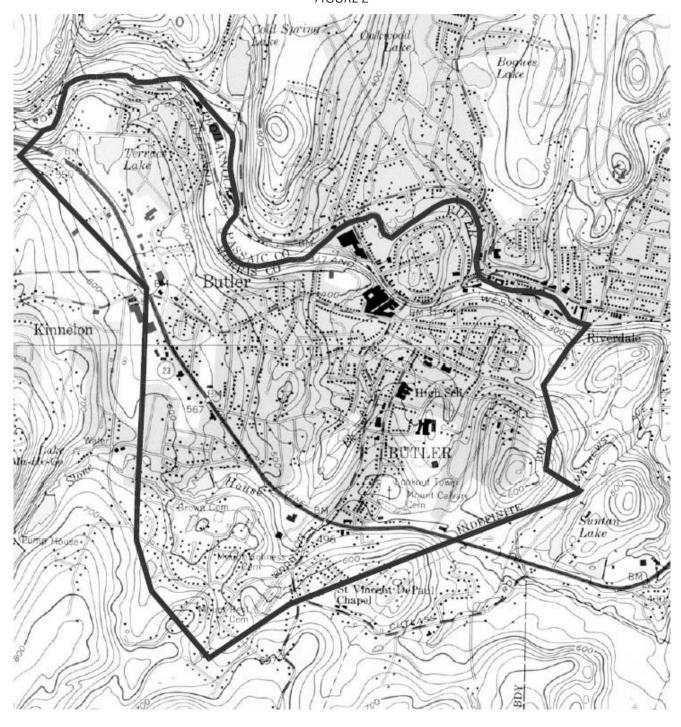
The Borough will utilize the waiver criteria contained in Subchapter 5 of the Stormwater Management Rules to develop a Mitigation Plan in order to grant necessary waivers from the design and performance standards at major land developments on a case-by-case basis. Development of this Mitigation Plan will be based upon the Mitigation Plan requirements contained in Subchapter 4 of the Stormwater Management Rules.

FIGURE 1



Source: New Jersey Geological Survey Report GSR-32.

FIGURE 2



Source: Wanaque and Pompton Plains USGS Quadrangles

FIGURE 3

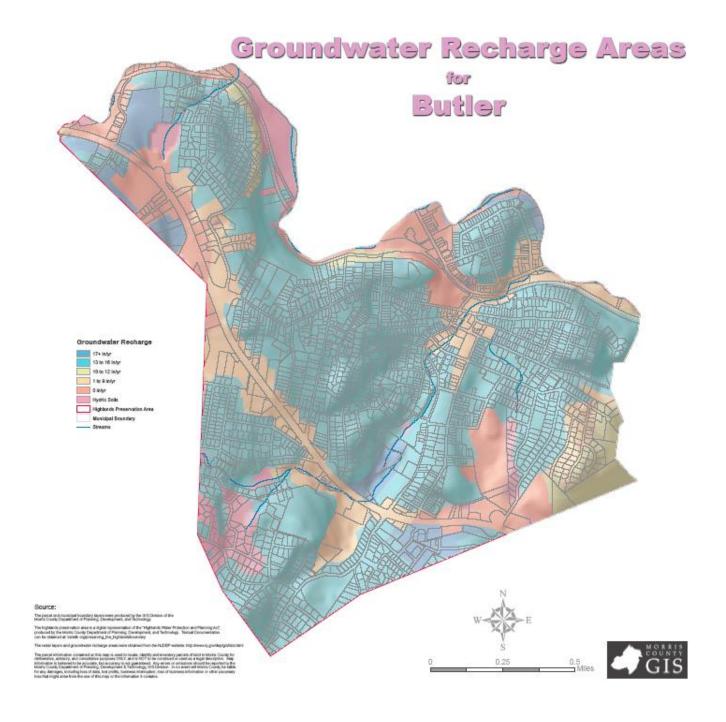


FIGURE 4

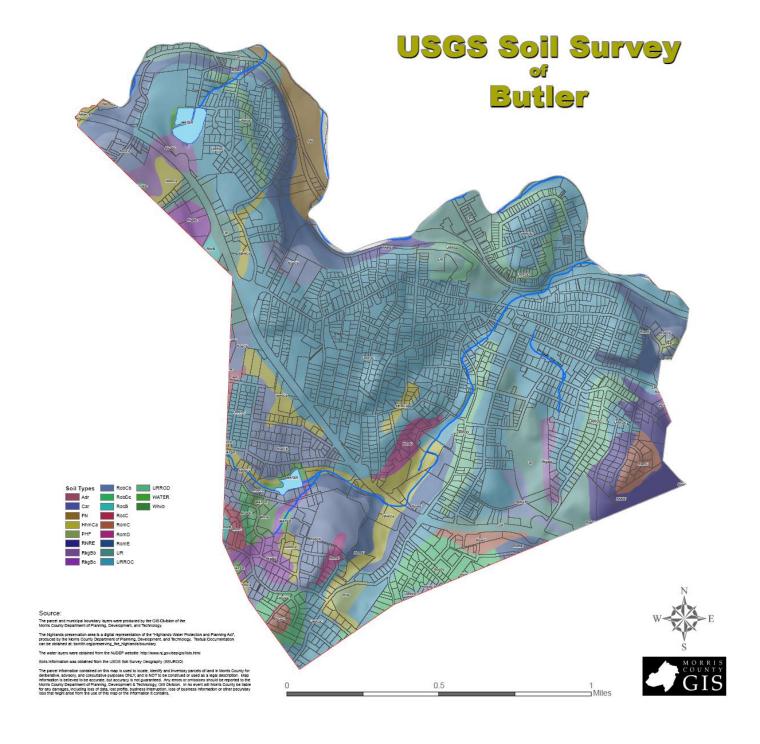


FIGURE 5

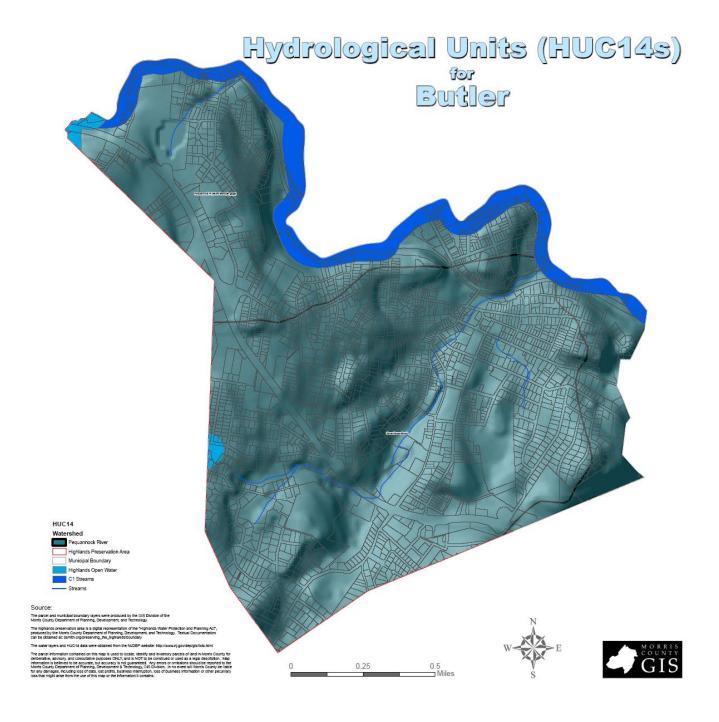


FIGURE 6

